

NORTHROP EXHIBIT H

3/11/92

①

Key features:

BSAC

PCR or thermal-cycle driven
enzymatic reactions, but
includes other DNA (or
other biochem or chem) reactions

All techns. involving reaction-based
methodologies

Ability to intorg elec, mech
or optical comp's. using microfab
techs:

Reaction parameter control: heating,
pumping, circulating, cooling

Reaction or reagent detection-manipulation

with Appl. deifed Fig. 2 chamber &
specific sys. for carrying out
PCR reactions. What are
minimum comp's. of such a system?

Output:
mass change,
density
viscosity

- Biochem reaction manip, control & detection
- ① chamber-wave devices - to pp, mix & detect;
② electrokinetic effects to pp, mix or phase; ③ interg-T control devices; ④ optical filters;
⑤ chamber w/ heating elements

ATT

Allen Northrup

Dick White

1/11/92

→ thermal cycling

claim: mixing chamber; also
clean system.

micro liter vials → used in system
smaller - can be done faster
w/ less power.

96° ↔ 55° → heat & cool.
system on

Re-packaged/chips → novel:
integ. on chips.

* PCR or any other ^{chem. or bio-chem} reaction that
requires thermal cycling.

Monolithic, microFab device →
1st time such a sys
has been done on this scale.

(microscopy) (3)

use of hand-wheel as
moves particles in single

* file
* can't see if I have
file or white's us
5,006, 149.

unifex: microheaters in chamber
next part of inv. / system.

Fiber optic inside reaction chamber
for detection.

PCR techs now take about ~~1 to 2 hours~~
~~1 to 2 hours~~ can get results in
1 to 5 minutes. Fastest

now in time ~ can get
results in a few seconds.

re cycles on the order of
a cycle. Due to small
volume & high surface area
could be portable & work on
batteries as opposed to 110V.

~~To diff. surfaces~~

* Reactions dep. on concentration

on → 3 volts in 96°C based on heater Res.
 off → $1/2$ volts in 55°C " "

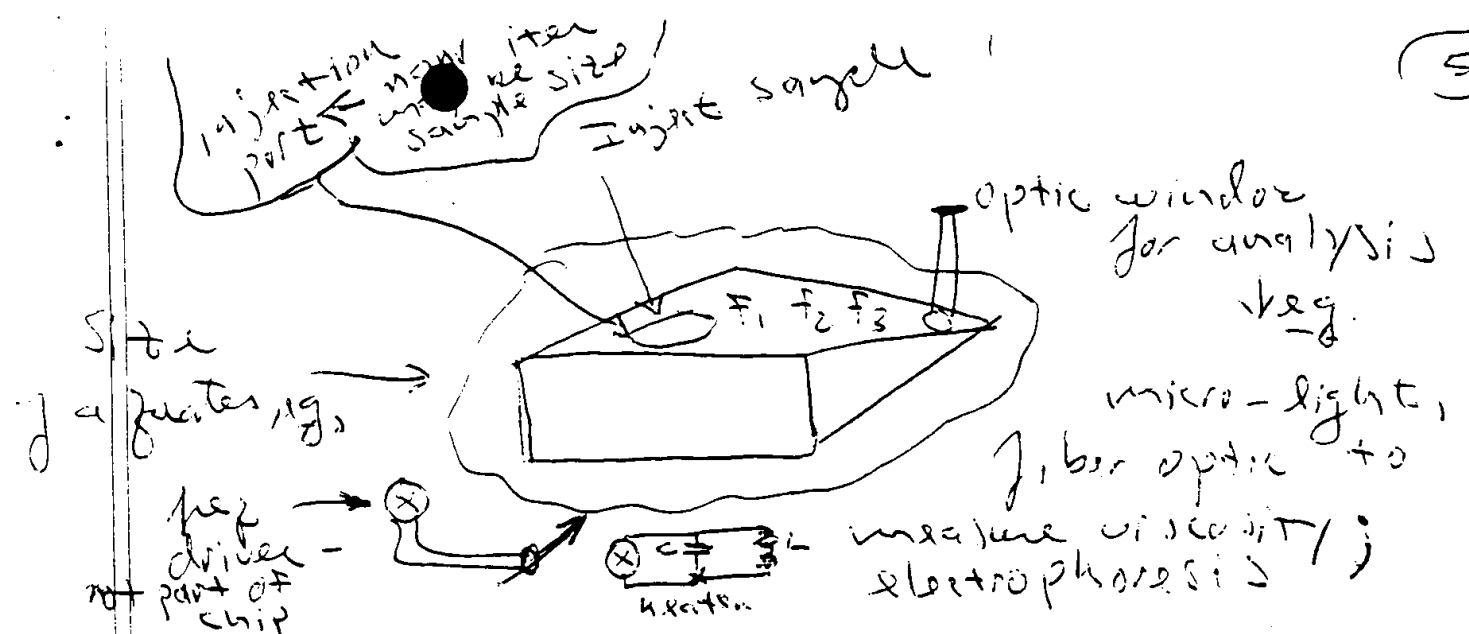
Monolithic Forb — is very important
 — can do in batches on
 wafers. Thus they can
 change & are disposable.

* Need spec. sheet for chamber
 fabrication

PP/ing in chamber — re Dick
 white

Chamber — includes ultrasonic
 agitator for mixing.

↓ Also useful for cell dispensing



pump, mixer etc run a diff pres (F1, F2, F3) so can turn diff cover on top by opening a diff pres. Heating is also done by turning F4 for heater.

Key doing PCR on chip w/ reaction chamber.

~~Materials~~ Materials used in chamber can negatively affect PCR reaction eg. presence of divalent cations will prevent PCR from doing.

Reactants on chip in advance of solid as a unit.

Use of surface tension to maintain reactant

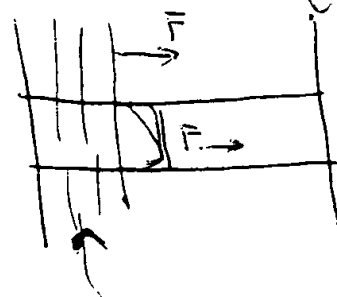
Possible talks / pubs : none on
the horiz; Oct 1992

Draft appl to Inverters by byling
to mid-June & file by end
of June

* Rotate drive

Adus: All parts of channels moved at
same speed - adv. of inab-
vone PP.

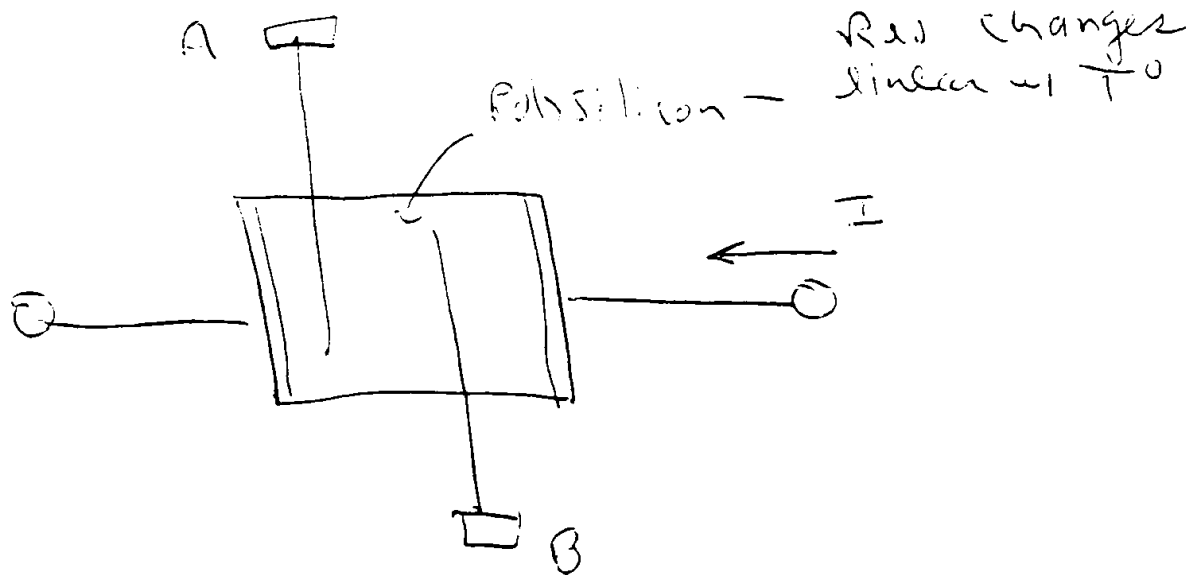
dee whitens
US 5,006,749



Blast Flow
- more control

Liquids - same
generators

T^0 control \rightarrow Nice feature.



Use ~~leads~~ ^{electrodes} A + B to measure T^0 change. Send in known current I + measure voltage bet. electrodes A + B.

This detail should be in log.

SiO_2 - is material at bottom
of chamber; std material
handled by bio-chemists

DNA probes - in chamber;
parts attach to probes + detector
change so know have attachment
to probes.